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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/668,559	ZUBER ET AL.	
	Examiner	Art Unit	
	Karie O'Neill Apicella	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 October 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) *7,8,11 and 12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,9,10,13 and 14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The Applicant's amendment filed on October 21, 2009, was received. Claim 1 has been amended. Claims 7, 8, 11 and 12 have been withdrawn from consideration as being drawn to a non-elected group. Therefore, Claims 1-6, 9-10 and 13-14 are pending in this office action.

2. The text of those sections of Title 35, U.S.C. code not included in this action can be found in the prior Office Action issued on April 21, 2009.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-6, 9-10 and 13-14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The phrase "isolated catalyst-coated membrane", in the preamble of Claim 1, is not supported by the specification of the instant invention. There is no support to indicate that the catalyst-coated membrane is "isolated" from any other features of the instant invention.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-6, 9-10 and 13-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what the term “isolated catalyst-coated membrane” means. It is unclear what the “catalyst-coated membrane" is isolated from and how the “catalyst-coated membrane" can be considered “isolated” if it also has a “protective film layer”.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 5-6 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Steck (EP 0586461 B1).

With regard to Claims 1 and 13, Steck discloses in Figure 4, an isolated catalyst-coated membrane with a protective film layer, called a gasket, for use in a solid polymer electrolyte fuel cell, comprising:

(a) a catalyst-coated ionomer membrane (16), consisting essentially of an anode (18) having a catalyst layer applied to the surface of the anode which faces and attaches to the ionomer membrane (16), an ionomer membrane (16), and a

cathode (20) having a catalyst layer applied to the surface of the cathode which faces and attaches to the ionomer membrane (16) (page 2, lines 16-19), wherein said ionomer membrane comprises two surfaces (page 2 lines 13-15) and each of said two surfaces is comprised of:

(i) an active area, wherein said active area is coated with said anode or cathode catalyst layer when the anode electrode and cathode electrode are attached to the ionomer membrane by the surface containing the catalyst (page 2, lines 16-19), and

(ii) a passive area which extends beyond the electrochemically active region (page 2 lines 27-30); and

(b) at least one layer of protective film, or a gasket (12, 14), attached to each of the two surfaces of said catalyst-coated ionomer membrane (16) (page 4 lines 45-46), wherein said at least one layer of protective film overlaps the passive area and the active area of each surface and wherein a layer sequence of membrane-catalyst layer-protective film (gasket) is formed in a region of each active area (See Figure 4 and page 5 lines 29-36).

The phrase "wherein said active area is coated with" is a process term in a product claim. Product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. “Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious

from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." *See MPEP 2113.* The prior art teaches a layer, as noted.

With regard to Claim 2, Steck discloses in Figure 4, wherein the passive area (16b) forms a perimeter around said active area (18, 20) (page 3 lines 52-57 and page 5 lines 29-36).

With regard to Claim 3, Steck discloses wherein 86% of the membrane is utilized as a cation exchange site with catalyst coating, and the region of the passive area that is overlapped by the protective layer is about 100%, as can be seen in any of Figures 3-6 wherein the active area is that which is covered by the catalyzed electrode (18, 20) (page 6 lines 11-15).

With regard to Claim 5, Steck discloses wherein the organic polymer material comprises a non-hydrophilic thermoplastic elastomeric material (page 3 line 36), including a butadiene/styrene copolymer and ethylene/propylene copolymer (page 5 lines 12-15).

With regard to Claim 6, Steck discloses wherein the ionomer membrane comprises a substance selected from the group consisting of a solid polymer ion exchange membrane, typically a porous, sulfonated material (page 3 lines 35-36).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 4, 9-10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steck (EP 0586461 B1), as applied to Claims 1-3, 5-6 and 13 above, and in further view of Fukuoka et al. (JP 10-154521).

Steck discloses the catalyst coated membrane in paragraph 8 above, but does not disclose wherein at least one layer of protective film comprises an organic polymer with a thickness in the range of 10 to 150 microns, at least one gas diffusion layer, wherein said at least one gas diffusion layer covers at least a portion of the active area of said catalyst-coated membrane and contacts, overlaps and/or penetrates the at least one layer of protective film of the catalyst-coated membrane, and wherein the region of the gas diffusion layer contacted by the at least one layer of protective film is in the range of 0.5 to 50% of the total area of the gas diffusion layer.

Fukuoka et al., however, discloses in Drawings 1-4, a polymer fuel cell comprising an ionomer membrane (1), a catalyst layer (2) formed on both sides of the ionomer membrane to form an active layer, a gas diffusion layer (3) covering at least a portion of the catalyst active layer (2), and a protective film, called a reinforcing film (7), having a frame shape arranged on one or both sides of the catalyst layer (2) and the gas diffusion layer (3) (paragraphs 0018-0020). The protective film, or reinforcing film (7), is made of a fluororesin and has a thickness of 50 micrometers (paragraph 0026). The protective film also has a size of 45mmx45mm, and the inner circumference of the reinforcing film (7) might lap with the periphery section of the catalyst layer (2) by about

5mm (paragraph 0029 and Drawing 4), and as can be seen in the drawings, the region of the gas diffusion layer contacted by the protective film (7) is in a range of 0.5 to 50% of the total area of the gas diffusion layer (3).

Based on the teachings of these references, it would have been obvious at the time of the invention to use a gas diffusion layer which covers at least a portion of a catalyst layer and makes contact with a protective film having a thickness of 50 mm as part of the catalyst coated membrane of Steck, because Fukuoka teaches the protective film prevents breakage of the membrane without decreasing the effective area of an electrode and membrane, prevents breakage of the protective film at the time of assembly and creates a seal (paragraph 0015), as well as, the gas diffusion layer facilitates proper humidification of the membrane of the fuel cell (paragraph 0017). Further, Fukuoka et al. discloses that the gas diffusion layer will allow for the reactants to diffuse to the catalyst layers to generate electricity.

Response to Arguments

11. Applicant's arguments filed October 21, 2009, have been fully considered but they are not persuasive.

Applicant first argues, “Steck does not disclose the subject invention as set forth in amended claim 1, that is, a catalyst coated membrane, with a protective film layer, that is distinct and can be isolated from gas distribution layers (GDLs) and can exist separately outside a membrane electrode assembly.”

Steck does disclose a catalyst coated membrane with a protective film layer, as seen in the rejections above and in the previous rejection dated April 21, 2009. However, there is no support for the argument that Steck does not disclose the catalyst coated membrane being *distinct, isolated from gas distribution layers (GDLs) and existing separately outside of a membrane electrode assembly*, since none of these descriptions are recited in the claims.

Next, Applicant argues, "Steck discloses a different type of MEA technology -- one that is based on the use of gas diffusion electrodes (GDE), sometimes called catalyst-coated backings or catalyst-coated GDLs. These catalyst-coated backings or GDLs are laminated to uncoated ionomer membranes to form five-layer MEAs. In contrast, the present invention is directed towards catalyst-coated membranes (CCMs) in which the membrane is coated with catalyst layers on both sides."

Applicant's argument is not persuasive. Gas diffusion electrodes are electrode layers containing catalyst layers that are attached to or laminated to the membrane of the membrane electrode assembly. When the assemblies are finally put together as a whole, or laminated together, gas diffusion electrodes perform the same function as so-called catalyst-coated membranes formed by the anode catalyst layer being joined to one surface of the ionomer membrane and the cathode catalyst layer being joined to the other surface of the ionomer membrane.

Applicant continues to argue that "the electrodes of the present invention are formed by coating the ionomer membrane with catalyst inks. As stated in the specification, uncoated GDLs, which usually are carbon-based substrates such as

carbon fiber paper (or the "porous electrically conductive sheet material" of Steck), may later be placed against the catalyst layers of the inventive CCM of claim 1 in order to form MEAs".

The method in which the electrodes of the present invention are formed is not applicable to the final product, since the method has not been claimed and is not given patentable weight. The "porous electrically conductive sheet material" of Steck is part of what is considered to be the anode catalyst layer and the cathode catalyst layer since the catalyst material is applied to the surface of the "porous electrically conductive sheet material" and later adjoins the ionomer membrane to form the catalyst-coated membrane. The Fukuoka et al. reference, however, teaches the use of gas diffusion electrodes covering at least a portion of the catalyst active layer and facilitating the reactants to diffuse to the catalyst layers to generate electricity.

Applicant further argues that "Steck does not disclose an isolated catalyst-coated membrane".

The term "isolated" is not supported in the specification and has raised new matter issues, which are addressed above. Furthermore, in response to applicant's arguments, the recitation "isolated catalyst-coated membrane" has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural

limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Additionally, Applicant argues that, "Steck does not disclose a CCM consisting essentially of an anode catalyst layer, an ionomer membrane, and a cathode catalyst layer, as now required by the amended claims. As stated above, the catalyst layers in Steck are part of his GDEs, which comprise catalysts and carbon-based substrates."

As stated in paragraph 8 of the rejection above, Steck does disclose “an anode (18) having a catalyst layer applied to the surface of the anode which faces and attaches to the ionomer membrane (16), an ionomer membrane (16), and a cathode (20) having a catalyst layer applied to the surface of the cathode which faces and attaches to the ionomer membrane (16) (page 2, lines 16-19)”. The carbon-based substrate or “porous electrically conductive sheet material” of Steck is part of what is considered to be the anode catalyst layer and the cathode catalyst layer since the catalyst material is applied to the surface of the “porous electrically conductive sheet material” and later adjoins the ionomer membrane to form the catalyst-coated membrane. The claim limitations do not indicate that the “anode catalyst layer” and the “cathode catalyst layer” cannot contain a backing material which makes it into a "layer" that is joined to the ionomer membrane. Applicant’s argument is not persuasive.

Finally, Applicant argues, "the catalyst layers of the present invention are applied to the ionomer membrane and do not have porous electrically conductive sheet materials present. The catalyst layers of the CCMs of the present invention comprise electro-catalysts (see, page 3, line 1, of the specification) and are manufactured by

coating ionomer membranes using catalyst inks according to US 6,309,772 (see, Example 1 in the specification). In all the examples presented in the present application, CCMs are used in which catalyst inks are deposited directly on the membrane. The inventive CCMs do not contain carbon based substrates."

The method by which the CCMs of the instant invention are manufactured is irrelevant since these methods have not been claimed. The final product of the instant invention and the Steck reference are structurally the same and perform the same functions. As such, nowhere in the claim language does it indicate that carbon based substrates are not present in the invention. Steck discloses an anode catalyst layer and a cathode catalyst layer which comprise a carbon-based backing in conjunction with the catalyst material that form the "catalyst layer".

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill Apicella whose telephone number is (571)272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/
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KOA